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Chlamydia Curriculum

Chlamydia

Chlamydia trachomatis

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Chlamydia Curriculum

Learning Objectives

Upon completion of this content, the learner will be able to:

1. Describe the epidemiology of chlamydial infection in the U.S.
2. Describe the pathogenesis of *Chlamydia trachomatis*.
3. Describe the clinical manifestations of chlamydial infection.
4. Identify common methods used in the diagnosis of chlamydial infection.
5. List CDC-recommended treatment regimens for chlamydial infection.
6. Summarize appropriate prevention counseling messages for patients with chlamydial infection.
7. Describe public health measures for the prevention of chlamydial infection.

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Chlamydia Curriculum

Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. Diagnosis
- V. Patient management
- VI. Prevention

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Lesson I: Epidemiology:
Disease in the U.S.

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Chlamydia CurriculumEpidemiology

Incidence and Cost

- Estimated 3 million new cases in U.S. annually
- Most frequently reported disease in U.S.
- Estimated annual incidence of selected STDs:
 - Trichomoniasis — 7.4 million
 - Human Papillomavirus (HPV) — 6.2 million
 - Herpes Simplex Virus (HSV) — 1.6 million
 - Gonorrhea — 718,000
 - Syphilis — 37,000
- Direct and indirect annual costs total approximately \$2.4 billion

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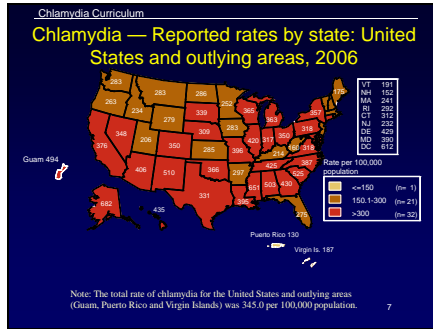
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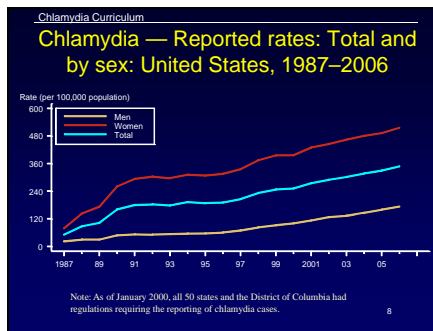
Chlamydia CurriculumEpidemiology

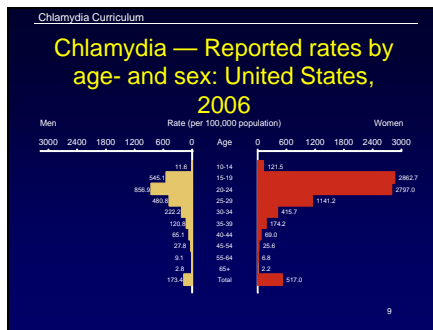
National Chlamydia Surveillance Systems

- Case Reporting
- National Prevalence Survey
- Prevalence Monitoring (sentinel clinics)

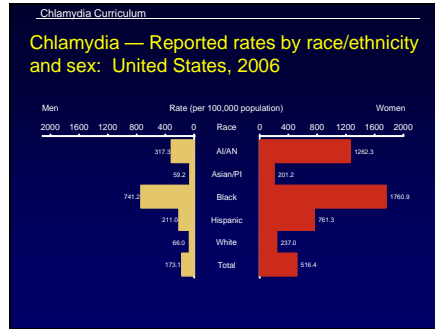
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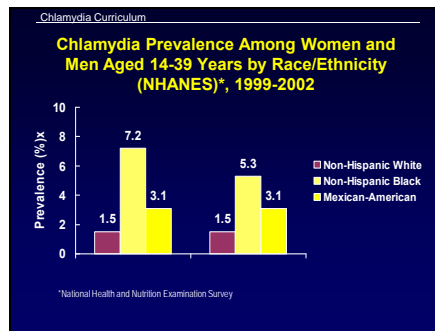




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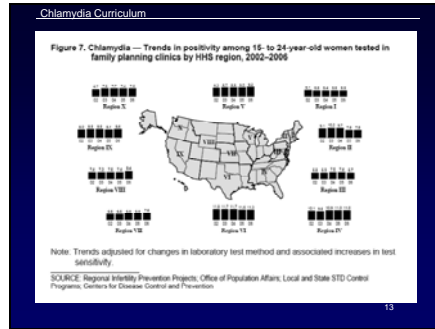
Epidemiology

Screening Results: Women in Sentinel Clinics

- Prevalence (approximate) in selected female populations:
 - Family planning clinics, 3%-14%
 - Indian Health Service, 7%-10%
 - Youth detention facilities, 6%-28%
 - National job training recruits, 4%-17%

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Risk Factors

- Adolescence
- New or multiple sex partners
- History of STD infection
- Presence of another STD
- Oral contraceptive user
- Lack of barrier contraception

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Chlamydia Curriculum Epidemiology

Transmission

- Transmission is **sexual** or **vertical**
- Highly transmissible
- Incubation period 7-21 days
- Significant asymptomatic reservoir
- Re-infection is common
- Perinatal transmission results in neonatal conjunctivitis in 30%-50% of exposed babies

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Lesson II: Pathogenesis

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Pathology

Microbiology

- Obligatory intracellular bacteria
- Infect columnar epithelial cells
- Survive by replication that results in the death of the cell
- Takes on two forms in its life cycle:
 - Elementary body (EB)
 - Reticulate body (RB)

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Pathology

Life Cycle of Chlamydia

The diagram illustrates the life cycle of Chlamydia within a host cell. It begins with elementary bodies (EBs) entering the cell. These EBs develop into reticulate bodies (RBs), which then multiply. The RBs eventually mature and differentiate back into EBs, which are then released from the cell to infect new cells. The cycle is shown in a circular fashion with arrows indicating the progression. Labels include 'Elementary Body', 'Reticulate Body', and 'Host Cell'.

Source: California STD/HIV Prevention Training Center

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Chlamydia Curriculum	Pathology
<h2>Chlamydiaceae Family</h2> <h3>(species that cause disease in humans)</h3>	
Species	Disease
<i>C. trachomatis</i>	Trachoma, NGU,
2 biovars, non-LGV	MPC, PID,
LGV	conjunctivitis,
	Infant pneumonia,
	LGV
<i>C. pneumoniae</i>	Pharyngitis,
	bronchitis,
	pneumonia
<i>C. psittaci</i>	Psittacosis

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Lesson III: Clinical Manifestations

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	Local Infection	Complication	Sequelae
Men →	Conjunctivitis Urethritis Proctitis	Epididymitis Reiter's syndrome (rare)	Infertility (rare) Chronic arthritis (rare)
Women →	Conjunctivitis Urethritis Cervicitis Proctitis	Endometritis Salpingitis Pelvic peritonitis Reiter's syndrome (rare)	Infertility Ectopic pregnancy Chronic pelvic pain Chronic arthritis
Infants →	Conjunctivitis Pneumonitis Pharyngitis Rhinitis	Chronic lung disease?	Rare, if any

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Chlamydia CurriculumClinical Manifestations

C. trachomatis Infection in Men


- Urethritis—One cause of non-gonococcal urethritis (NGU)
 - Majority (>50%) asymptomatic
 - Symptoms/signs if present: mucopurulent, mucoid or clear urethral discharge, dysuria
 - Incubation period unknown (probably 5-10 days in symptomatic infection)

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Chlamydia CurriculumClinical Manifestations

**Non-Gonococcal Urethritis:
Mucoid Discharge**



Source: Seattle STD/HIV Prevention Training Center at the University of Washington/UW HSCER Slide Bank.23

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Chlamydia CurriculumClinical Manifestations

**C. trachomatis Complications
in Men**

- Epididymitis
- Reiter's Syndrome

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Chlamydia CurriculumClinical Manifestations

Swollen or tender testicles
(epididymitis)



Source: Seattle STD/HIV Prevention Training Center at the University of Washington 25

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Chlamydia CurriculumClinical Manifestations

C. trachomatis Infections in Women


- Cervicitis
 - Majority are asymptomatic
 - Local signs of infection, when present, include:
 - Mucopurulent endocervical discharge
 - Edematous cervical ectopy with erythema and friability
- Urethritis
 - Usually asymptomatic
 - Signs/symptoms, when present, include dysuria, frequency, pyuria

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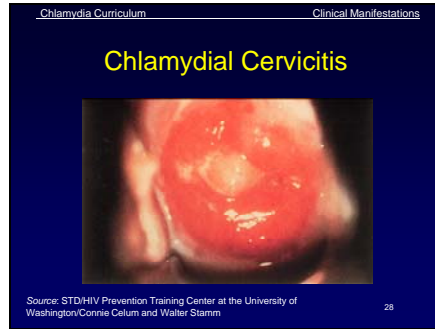
Chlamydia CurriculumClinical Manifestations

Normal Cervix

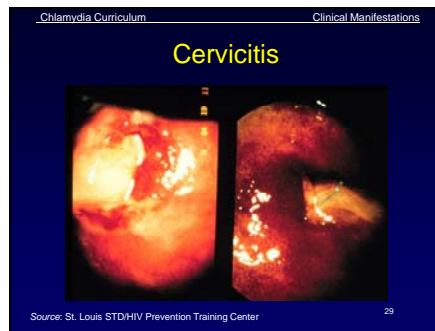


Source: STD/HIV Prevention Training Center at the University of Washington/Claire E. Stevens 27

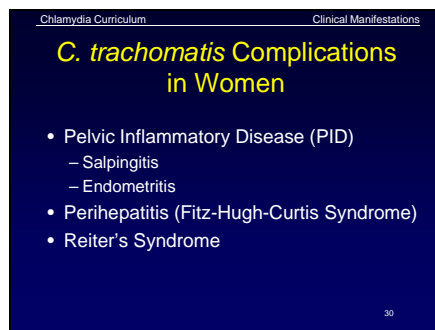
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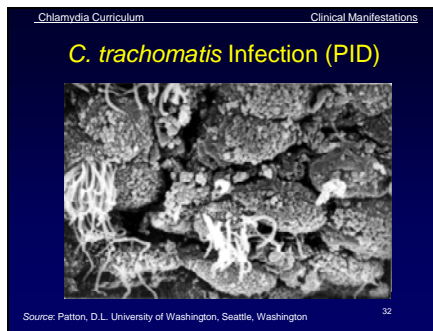
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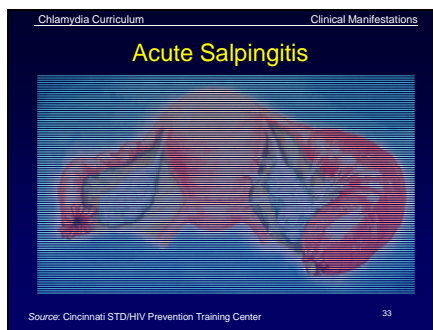
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Clinical Manifestations

C. trachomatis Syndromes Seen in Men or Women

- Non-LGV serovars
 - Conjunctivitis
 - Proctitis
 - Reiter's Syndrome
- LGV serovars
 - Lymphogranuloma venereum


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Clinical Manifestations

LGV Lymphadenopathy



Source: CDC Division of STD Prevention Clinical Slides 35

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Clinical Manifestations

C. trachomatis Infections in Infants

- Perinatal clinical manifestations:
 - Inclusion conjunctivitis
 - Pneumonia

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Chlamydia CurriculumClinical Manifestations

C. trachomatis Infections in Children

- Pre-adolescent males and females:
 - Urogenital infections
 - Usually asymptomatic
 - Vertical transmission
 - Sexual abuse

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Lesson IV: Diagnosis

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Chlamydia CurriculumDiagnosis

Testing Technologies

- Culture
- Non-culture tests
 - Nucleic Acid Amplification Tests (NAATs)
 - Non-Amplification Tests
 - Serology

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Diagnosis

Culture

- Historically the "gold standard"
- Variable sensitivity (50%-80%)
- High specificity
- Use in legal investigations
- Not suitable for widespread screening

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Diagnosis

NAATs

- NAATs amplify and detect organism-specific genomic or plasmid DNA or rRNA
- Commercially available NAATs include:
 - Becton Dickinson BDProbe Tec®
 - Gen-Probe AmpCT, Aptima®
 - Roche Amplicor®
- Can detect *N. gonorrhoeae* in the same specimen
- Significantly more sensitivity than other tests

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Diagnosis

NAATs (continued)

- FDA cleared for:
 - All NAATs
 - urethral swabs from men
 - cervical swabs
 - urine from men and women
 - Certain NAATs
 - vaginal swabs
- Non-FDA cleared for:
 - rectal
 - pharyngeal (some laboratories have met regulatory requirements)

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Diagnosis

Non-Amplification Tests

- Direct fluorescent antibody (DFA)
 - Detects intact bacteria with a fluorescent antibody
 - Variety of specimen sites
- Enzyme immunoassay (EIA)
 - Detects bacterial antigens with an enzyme-labeled antibody
- Nucleic acid hybridization (NA probe)
 - Detects specific DNA or RNA sequences of *C. trachomatis* and *N. gonorrhoeae*

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Diagnosis

Serology

- Rarely used for uncomplicated infections
- Comparative data between types of serologic test are lacking
- Criteria used in LGV diagnosis
 - Complement fixation titers >1:64 can support diagnosis in the appropriate clinical context
 - Serologic test interpretation for LGV is not standardized

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Lesson V: Patient Management

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Treatment of Uncomplicated Genital Chlamydial Infections

CDC-recommended regimens

- Azithromycin 1 g orally in a single dose, OR
- Doxycycline 100 mg orally twice daily for 7 days

Alternative regimens

- Erythromycin base 500 mg orally 4 times a day for 7 days, OR
- Erythromycin ethylsuccinate 800 mg orally 4 times a day for 7 days, OR
- Ofloxacin 300 mg orally twice a day for 7 days
- Levofloxacin 500 mg orally once a day for 7 days

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Chlamydia Curriculum Management

Treatment of Chlamydial Infection in Pregnant Women

CDC-recommended regimens

- Azithromycin 1 g orally in a single dose, OR
- Amoxicillin 500 mg orally 3 times a day for 7 days

Alternative regimens

- Erythromycin base 500 mg orally 4 times a day for 7 days, OR
- Erythromycin base 250 mg orally 4 times a day for 14 days, OR
- Erythromycin ethylsuccinate 800 mg orally 4 times a day for 7 days, OR
- Erythromycin ethylsuccinate 400 mg orally 4 times a day for 14 days, OR

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Treatment of Neonatal Conjunctivitis and/or Pneumonia

CDC-recommended regimen

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into 4 doses daily for 14 days

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Management

Treatment of Chlamydial Infection in Children

Children who weigh <45 kg:

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into 4 doses daily for 14 days

Children who weigh ≥45 kg, but are <8 years of age:

- Azithromycin 1 g orally in a single dose

Children ≥8 years of age:

- Azithromycin 1 g orally in a single dose, OR
- Doxycycline 100 mg orally twice a day for 7 days

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Management

Treatment of Lymphogranuloma Venereum (LGV)

CDC-recommended regimen

- Doxycycline 100 mg orally twice a day for 21 days

Alternative regimen

- Erythromycin base 500 mg orally 4 times a day for 21 days

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Management

Repeat Testing after Treatment

- Pregnant women
 - Repeat testing, preferably by NAAT, 3 weeks after completion of recommended therapy
- Non-pregnant women
 - Test of cure not recommended unless compliance is in question, symptoms persist, or re-infection is suspected
 - Repeat testing recommended 3-4 months after treatment, especially adolescents due to high prevalence of repeated infection
 - Screen at next health care visit

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Lesson VI: Prevention

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Prevention

Why Screen for Chlamydia?

- Screening can reduce the incidence of PID by more than 50%.
- Most infections are asymptomatic.
- Screening decreases the prevalence of infection in the population and reduces the transmission of disease.

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Prevention

Screening Recommendations:
Non-pregnant Women

- Sexually active women age 25 years and under should be screened annually.
- Women >25 years old should be screened if risk factors are present.
- Repeat testing of all women 3-4 months after treatment for *C. trachomatis* infection, especially adolescents.
- Repeat testing of all women treated for *C. trachomatis* when they next present for care within 12 months.

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Prevention

Screening Recommendations:
Pregnant Women

- Screen all pregnant women at the first prenatal visit.
- Pregnant women aged <25 years and those at increased risk for chlamydia should be screened again in the third trimester.

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Prevention

Partner Management

- Sex partners should be evaluated, tested, and treated if they had sexual contact with the patient during the 60 days preceding the onset of symptoms or diagnosis of chlamydia.
- Most recent sex partner should be evaluated and treated even if the time of the last sexual contact was >60 days before symptom onset or diagnosis.
- Delivery of therapy to sex partners by heterosexual male or female patients might be an option.

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Prevention

Reporting

- Chlamydia is a reportable STD in all states.
- Report cases to the local or state STD program.

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Prevention

Prevention Counseling

- Nature of the infection
 - Chlamydia is commonly asymptomatic in men and women.
 - In women, there is an increased risk of upper reproductive tract damage with re-infection.
- Transmission issues
 - Effective treatment of chlamydia may reduce HIV transmission and acquisition.
 - Abstain from sexual intercourse until partners are treated and for 7 days after a single dose of azithromycin or until completion of a 7-day regimen.

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Prevention

Prevention Counseling (continued)

- Risk reduction

The clinician should:

 - Assess the patient's behavior-change potential.
 - Discuss prevention strategies (abstinence, monogamy, condoms, limit number of sex partners, etc.). Latex condoms, when used consistently and correctly, can reduce the risk of transmission of chlamydia.
 - Develop individualized risk-reduction plans.

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Case Study

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Case Study



History

- Suzy Jones: 17-year-old college student who presents to the Student Health Center seeking advice about contraception
- Shy talking about her sexual practices
- Has never had a pelvic exam
- Has had 2 sex partners in past 6 months
- Does not use condoms or any other contraceptives
- Her periods have been regular, but she has recently noted some spotting between periods. Last menstrual period was 4 weeks ago.
- Denies vaginal discharge, dyspareunia, genital lesions, or sores

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Case Study

Physical Exam

- Vital signs: blood pressure 118/68, pulse 74, respiration 18, temperature 37.1° C
- Breast, thyroid, and abdominal exam within normal limits
- Genital exam reveals normal vulva and vagina
- The cervix appears inflamed, bleeds easily, with a purulent discharge coming from the cervical os.
- Bimanual exam is normal without cervical motion pain, uterine or adnexal tenderness.

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Case Study

Questions

1. What is the initial clinical diagnosis?
2. What is the most *likely* microbiologic diagnosis?
3. Which laboratory tests should be ordered or performed?
4. What is the appropriate treatment at the initial visit?

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Chlamydia CurriculumCase Study

Laboratory Results

- NAAT for *Chlamydia trachomatis*: positive
- NAAT for *Neisseria gonorrhoeae*: negative
- RPR: negative
- Wet mount: pH 4.2, no clue cells or trichomonads but numerous WBCs
- KOH preparation: negative for "whiff test"
- HIV antibody test: negative
- Pregnancy test: negative

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Chlamydia CurriculumCase Study

Questions

5. What is the final diagnosis?
6. What are the appropriate prevention and counseling messages for Suzy?
7. Who is responsible for reporting this case to the local health department?

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Chlamydia CurriculumCase Study

Partner Management

Suzy's sex partners from the past year:

- John – Last sexual exposure 5 weeks ago
- Tom – Last sexual exposure 7 months ago
- Michael – Last sexual exposure 2 weeks ago



8. Which sex partners should be evaluated, tested, and treated?

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Case Study

Follow-Up

Suzy returned for a follow-up visit at 4 months.

- Her repeat chlamydia test returned positive.
- Suzy stated that her partner, Michael, went to get tested, but the test result was negative so he was not treated.

9. What is the appropriate treatment at the 4-month follow-up visit?

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